

SOLID-CHEMICAL COMPOSITION AND METHODS FOR THE CHEMICAL OXIDATION AND AEROBIC BIOREMEDIATION OF ENVIRONMENTAL CONTAMINATION

ABSTRACT

The main purpose of the present invention is to provide solid-chemical compositions and methods and means for their use which specifically: (1) provide for a sustained release of active oxygen and complex inorganic phosphates; and (2) create, enhance, and maintain oxidizing and aerobic conditions which favor non-exothermic, chemical-oxidation processes and aerobic bioremediation and fungal bioremediation processes. The present invention discloses advanced solid-chemical compositions and methods for the non-exothermic chemical oxidation and aerobic and fungal biodegradation of organic compounds and certain inorganic contaminants which may be present in solid and liquid wastes, sludges, leachates, acid-mine drainages, waste waters, soils, sediments, ground waters, surface waters, and other environmental media. The preferred embodiments of the disclosed solid-chemical compositions are prepared and used in the forms of granules, briquettes, tablets, capsules, pellets, and the like, which among other advantages, are easier to handle and apply under typical field conditions. These preferred forms of the disclosed chemical compositions can be made to disintegrate subsequent to their application and/or upon contact with water in a significant and predictable manner via relatively minor variations in their formulation and manufacture. This improved functionality enables the time-dependent release profile(s) of the active-oxygen sources and other ingredients to be varied so as to optimize the remediation of contaminants based on site-specific factors or factors pertaining to the specific waste-stream, media and/or the contaminants therein. Organic contaminants which can be treated using this invention include many different types of petroleum products, and more recalcitrant contaminants such as PCBs, PAHs and pesticides can be degraded by using the disclosed compositions and methods to stimulate fungal biodegradation processes. This invention can also be used to treat inorganic contaminants such as the acids and metals present in acid-mine drainage (AMD).